

### **REMARKS**

Claims 1-40 are pending in this application. All of the pending claims are rejected. Claims 1, 8, 18, 23, 31, 34, 37, 41, 43 and 45 are currently amended. Reconsideration is requested.

Claims 1-5, 8-10, 12-15, 18-20, 23-25, 27-28, 31-36 and 41-44 are rejected under 35 U.S.C. 103(a) based on U.S. 4715470 ("Paulsson") in view of U.S. 4926937 ("Hademenos"). In the paragraph beginning at the bottom of page 2 of the Office action and ending at the top of page 3, the Office characterizes the cited combination as using the variable angle push rods of Hademenos to connect the source of Paulsson to the borehole **in a rigid manner**. Similarly, the arm is characterized in the second paragraph of page 12 of the Office action as being locked in place. It follows that the acoustic energy would then be transmitted through the push rods, rather than being created by the push rods pounding against the wall. The Examiner confirmed this interpretation of the cited combination in a brief telephone discussion on the point on September 19, 2007, for which Applicant is thankful.

As described in this application in paragraph [0030], "acoustic energy is generated into the formation 10 when two or more pads 30 **contact** the formation wall 20." (emphasis added) Consequently, "the pads may be of any material able to withstand the ... **impact** against the formation wall as induced by the motors." (emphasis added) In other words, the pads are not merely conduits of acoustic energy that operate by being secured and locked against the wall in a rigid manner, but rather generate the acoustic energy by striking the wall. Claims 1, 8, 18, 23, 31, 34, 37, 41, 43 and 45 have been amended to emphasize this distinction. For example, claim 1 as currently amended recites "said pads generate elastic waves through said earth formation upon activation of said first motorized reaction mass as a result of impact of the pads against the wall." This distinction helps control impendence.

Further, as described in paragraphs [0035-0036], this distinction permits control of the direction of propagation of the waves through the formation where multiple reaction masses are utilized. In particular, as recited in claims 34, 37, 43 and 45, direction of the elastic waves is a function of the phase of activation of the motorized reaction masses.

Applicant believes that the distinction of the pads impacting the wall is at least implicit in the claims as originally filed, and hopes that the persuasiveness of the arguments presented in the previous response will be appreciated in view of the emphasis of the distinction in the claims as currently amended. For example, the reaction mass (42) of Paulsson is situated parallel to the borehole for vibrating in the vertical direction to cause vertical shear waves,<sup>1</sup> but is not part of the clamping means (60), and therefore is not operationally connected with the hydraulic pistons (64). In other words, the axial force of the reaction mass is not translated into a radial striking force via pads. Consequently, much of the acoustic energy that would be generated by the reaction mass (42) would remain in the borehole as tubewaves, as described in the Background of the present application at paragraphs [0003-0007]. Further, the linkage arm of Hademenos is clearly designed for securing rather than striking, and would not withstand repeated impact with the wall at the force required to generate elastic waves of practical use. Hademenos also shows such a small contact surface (in contrast with the claimed pads) that damage to the wall would occur if the linkage arm did not fail upon impact with the wall at the force required to generate elastic waves of practical use.

Claims 6-7, 11, 16-17, 21-22, 29-30, 37-40, and 45-47 are rejected under 35 U.S.C. 103(a) based on Paulsson in view of Hademenos further in view of U.S. 5187331 ("Sakata"). The Office cites Sakata as teaching multiple reaction masses having weight and stiffness calculated to achieve particular results. However, like Paulsson and Hademenos, Sakata fails

to disclose that the pads generate the acoustic energy by striking the wall. As described above, this distinctive feature helps control impedance and the direction of propagation of the waves through the formation.

Independent claims 1, 8, 18, 23, 31, 34, 37, 41, 43 and 45 are allowable for the reasons stated above. The dependent claims further define the invention, and are allowable for the same reasons as their respective base claims.

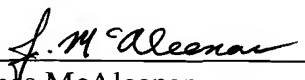
### Conclusion

In view of the above, each of the presently pending claims in this application is believed to be allowable over the cited references. Accordingly, the Examiner is respectfully requested to pass this application to issue unless a new search is to be performed.

Applicant believes no additional fee is due with this response. However, if a fee is due, please charge our Deposit Account N°. 19-0615, under Order No. 60.1543 from which the undersigned is authorized to draw.

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Respectfully submitted,

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<sup>1</sup> Column 3, lines 54-62